

REMARKS

The last Office Action has been carefully considered.

It is noted that claims 7, 8, and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the U.S. patent to Nolting in view of the U.S. patent to Corriveau.

Claims 1, 2, 6, and 9-12 are rejected under 35 U.S.C. 103 over the U.S. patent to Nolting in view of the U.S. patents to Corriveau and Hayashi.

At the same time the Examiner indicated that claims 3-5 were not rejected over the art.

Also, the claims have been renumbered by the Examiner, and the present Amendment is based on the renumbered claims.

The Examiner's indication of the allowability of some claims has been gratefully acknowledged. In connection with this indication, claim 3 has been amended to make it independent, and therefore the amended

claim 3 together with claims 4 and 5 which depend on it should be now in allowable condition.

Applicants have also amended claims 7, 13 and 17 to make corrections in compliance with the disclosure of the present application and to clarify the inventions disclosed in these claims.

Applicants have also added claim 21 and 22 which substantially correspond to claims 7 and 13 but additionally defines the feature "with the pump stopped".

Turning now to the Examiner's rejection of the claims, and in particular claims 7, 8, 13-20 as being unpatentable in view of a combination of the patents to Nolting and Corriveau, it is respectfully submitted that in independent claim 7 it is specifically defined that in a first operational phase of the internal combustion engine at low temperatures of the internal combustion engine the cooling medium feeding by thermal syphon action is prevented by closing the valve 34 and by closing the valve 36. With the method defined in this claim, with turned off cooling medium pump, the remaining cooling medium flow due to a thermal syphon action is prevented, by for example closing the corresponding valves. Such a method of

operation of a cooling- and heating circuit of a motor vehicle is not disclosed in any of the references.

It is believed to be advisable to explain that the thermal syphon action is the feeding of a fluid, here the cooling medium, exclusively because of a gravity force acting on the cooling medium. In the method defined in claim 7 the electrical cooling medium pump is not activated. It is believed to be sufficient to define in claim 7 the thermal syphon action. In new claim 21, applicants added the additional explanation that the method is performed with the pump stopped.

The above described method in which the electrical cooling medium pump in this first operational phase is stopped and the cooling medium feeding is performed exclusively because of the thermal syphon action is specifically disclosed in the specification, in particular in the last paragraph on page 7.

The novel features of the present invention that with cold outer temperatures in a first operational phase of the internal combustion engine the valve 34 to a main cooler is closed and simultaneously the valve 36 to the heating circuit is open is also not disclosed in the references.

The solution disclosed in the patent to Corriveau is exactly opposite and it discloses that the heating valve 32 is opened with a delay. In particular, as stated in column 5, line 5 to line 7:

"... during cold start cooling flow to the heater core (34) may be delayed by a few seconds or a few minutes to facilitate quicker engine warm-up".

A method for operation of a cooling- and heating circuit of a motor vehicle, in which at cold outer temperatures the heating and thereby the warming up of the vehicle inner space is prioritized before the fast heating of the combustion engine under cold start conditions is not disclosed in the prior art and can not be derived from it as a matter of obviousness.

It is therefore believed that claim 8 should be considered as patentably distinguishing over the art and should be allowed.

Claim 13 defines the features, for which the arguments presented with respect to claim 7 are fully applicable.

In the method defined in this claim the cooling medium supply produced by the thermal syphon action is regulated. In claim 13 this cooling medium supply is completely prevented by the closing of both valves 34 and

36. This claim deals exclusively with a cooling medium supply due this thermal syphon action. Here the electrically operated cooling medium pump is not activated. The fact that the cooling medium pump is stopped should be clear by the fact that the thermal syphon action is defined in claim 13. At the same time, applicants have presented claim 22 which substantially corresponds to claim 13 but additionally defines the feature of the pump stopped.

It is therefore believed that claims 13 and 22 should also be considered as patentably distinguishing over the art and should be allowed.

Claims 14-16 depend on claim 13, they share its presumably allowable features, and therefore they should be allowed as well.

Claim 17 defines a cooling and heating circuit of a motor vehicle with the features that correspond to the features of claim 8. It is therefore believed that claim 17 should be considered as allowable for the same reasons as claim 8.

It should be emphasized that this is true for all claims currently on file, that the problem of the thermal syphon action, or in other words a

cooling medium circulation under gravity force conditions, is not disclosed in the prior art. The references disclose two strategies for controlling the valves as well as for controlling an electrically driven pump, which however do not deal with a circulation when the pump for example is turned off and the valves are open. Because of the thermal syphon action which is described in the present application, in this case (open valves and inactive cooling medium pump), certainly cooling medium feeding is provided which in some cases counteracts the fast warming up of the electric motor in the startup phase. The method and the correspondingly designed heating- or cooling medium circuit provide measures against this thermal syphon action and lead to an improved warming of the internal combustion engine. In particular, the method in accordance with the present invention makes possible a prioritization of the warming of the combustion engine or the warming of the vehicle passenger space as desired by the vehicle occupant or the outer conditions, such as for example the outer temperature. This is not disclosed in the references applied by the Examiner and can not be derived from them as a matter of obviousness.

Claims 18-20 depend on claim 17, they share its presumably allowable features, and therefore they should be considered as allowable as well.

In connection with the Examiner's rejection of claims 1, 2, 6 and 9-12 over the combination of the patents to Nolting, Corriveau and Hayashi, it is respectfully submitted that such a combination can not be considered as obvious for a person skilled in the art. A person skilled in the art would not find in these references any suggestion to combine them with one another. The Examiner did not substantiate why such a combination can be considered as obvious. In particular, it can not be obvious to combine three references without any hint or suggestion for such a combination in the references.

The Examiner's arguments related to the obviousness of the combination can be considered only as a hindsight of the Examiner which familiarize himself with the present invention. The Examiner took individual features from the references and combined them in a specific way which was not derived from the references themselves but was suggested by the examiner. The first question is why a person skilled in the art has a reason to combine a second reference of the prior art with the first reference. The

question is if a combination of these two references was actually close to the applicant's invention, why a person skilled in the art would combine the combination of the two references with the third reference.

It is believed that it can not be justifiable to familiarize with the new features of the present invention, and then by using the hindsight to find individual features in the prior art. It is not explained why a person skilled in the art, in the event if he discovered one reference, would combine it with a second reference and then would combine it with a third reference, and why such a combination then would lead to the applicant's invention as defined in the claims. The general argumentation that this is obvious is not permissible and does not justify the rejection of the claims.

It is further respectfully submitted that even if for some unknown reasons a person skilled in the art combined the teachings of the patent to Nolting, Corriveau, Hayashi, which in the applicant's opinion can not be considered as justifiable at all, he would still not arrive at the applicant's invention as defined now in the claims.

Claim 1 specifically defines that:

"A feeding direction of the electrically operated pump in a first operational phase of the internal combustion engine at low temperatures of the internal combustion engine and turned on first cooling medium path, and feeding the cooling medium by the pump in a lower region of the internal combustion engine"

In contrast to this, the pump 34 in the device disclosed in the patent to Hayashi, operates for bringing the cooling medium level to the limiting value provided by the cooling medium level detectors 40 and 42. Above this level determined by a connecting line of the detectors 40 and 42, the cooling medium is not fed by the pump 34. In particular, the pump 34 of the device disclosed in the patent to Hayashi does not operate for feeding the cooling medium through a first cooling medium path which also contains the radiator 26.

In the description of the device disclosed in the patent to Hayashi, it is specifically stated that a separator 28 is available, which operates for retaining the liquid droplets or foam, so that the vapor can pass the separator 28 and fed to the radiator 26. In column 1, starting from line 55 in the patent to Hayashi the following is disclosed:

"Disposed in the vapour this charge port (22) is a separator (28) which in his embodiment takes the form of a mess screen. Separator (28) serves to separate the droplets of liquid and/or foam which tend to be produced by the bowling action, from the vapour per se and minimize unnecessary liquid loss from the cooling jacket".

In the apparatus and method of the applicant's invention the electrically operating pump 14 however operates for providing the cooling medium flow through the first, second, and third cooling medium paths, which feeds the cooling medium flows through this path.

In contrast to the apparatus claimed in the present application, in the patent to Hayashi it is clearly indicated that the cooling medium is not fed, and in particular is not fed with an electrical cooling medium pump in a first operational condition (cold start) through a first cooling medium path (bypass conduit). The cooling medium pump in the patent to Hayashi operates for producing a certain stationary cooling medium level in the cylinder head.

In the patent to Hayashi the possibility is disclosed to rotate the cooling medium pump in an opposite direction; however it serves only for pumping out the cooling medium with a cold motor from the motor to a certain point. A circulation of the cooling medium through a first cooling medium path in particular through a bypass conduit can not be derived from the patent to Hayashi.

It can be specifically derived from the patent to Hayashi that the cooling medium must not be circulated. For example in column 3, starting from line 65 in the patent to Hayashi, it is stated:

"It will be noted that with the present invention the flow rate of coolant is extremely low as compared with the water circulation type."

The cooling system of Hayashi is therefore not comparable with the circulating cooling system of the applicant's invention. The system of Hayashi leads exactly away from the new features of the present invention as defined in the claims. A combination of the cooling system disclosed in the patent to Hayashi with the cooling systems disclosed in the patents to Nolting and Corriveau is not obvious, despite the Examiner's statement, since these systems differ from one another in principle.

Moreover, as claimed in the present application, in the applicant's invention the feeding direction of the pump is reversed and thereby the electric pump feeds the cooling medium in a lower region of the internal combustion engine.

With this reverse the cold cooling medium flow of the internal combustion engine first passes into the region of the cylinder head and acts

there on the hot combustion chamber. Because of the high temperatures and the great temperature difference, the cooling medium can take a lot of heat and release it during flowing through the cylinder block, so that the internal combustion engine is warmed also in its lower region. By the reverse of the pump rotary direction the heat is supplied over the shortest path from the hot cylinder head to the cold motor block, which leads to a uniform warming of the cylinder walls. It should be mentioned that in the patent to Nolting the cooling medium flow is not determined by an electrically driven pump as claimed in the present application. In the patent to Nolting it is explicitly disclosed that the electrical water pump is an auxiliary pump which is connected in a high throughput region. In particular, in a first operational phase of the internal combustion engine at low temperatures of the internal combustion engine in contrast to the method proposed by the applicant, in the patent to Nolting the cooling medium flow is controlled by the mechanical pump. This is disclosed in the patent to Nolting, in column 3, starting from line 64 as follows:

"Forcing the start-up of the engine (10), mechanical pump (22) starts the conveyance of the coolant... in the case of a cold engine (10), the coolant flows from the first cooling circuit connection (11), via the bypass (17) and the mechanical pump (22) back to the second cooling circuit connection (12)."

It is therefore respectfully submitted that the new features of the present invention as defined in claim 1 clearly and patentably distinguish from the prior art and should be considered as new and patentable, since they can not be derived from the combination of the references applied by the Examiner. Moreover, such a combination can not be considered as obvious.

In view of the above presented arguments, it is believed that the combination of the teachings of the patent to Nolting, Corriveau and Hayashi would not lead to the applicant's invention as defined in claim 1.

Therefore claim 1 should be considered as patentably distinguishing over the art and should be allowed.

Claims 2-6 depend directly or indirectly on claim 1, they share its presumably allowable features, and therefore they should be considered also as allowable.

As for the independent claim 9, it is respectfully submitted that the arguments presented with respect to claim 1 should be considered as

fully applicable with respect to claim 9, and therefore claim 9 should be considered as patentably distinguishing over the art and should be allowed.


Finally, claims 10-12 depend on claim 9, they share its presumably allowable features, and they should be allowed as well.

In view of the above presented remarks and amendments, it is respectfully submitted to allow the present application with all the claims currently on file.

Reconsideration and allowance of the present application is most respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawings be further amended or corrected in formal respects in order to place this case in condition for final allowance, then it is respectfully requested that such amendments or corrections be carried out by Examiner's Amendment, and the case be passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing this case to allowance, he is invited to telephone the undersigned (at 631-549-4700).

Respectfully submitted,



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